North Dakota Drafting

Content Standards

Approved and Adopted
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North Dakota Department of Career and Technical Education
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The North Dakota State Board for Career and Technical Education has reviewed this standards document, approved the content, and officially adopted the material until 2010.

North Dakota
Drafting
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North Dakota

Drafting Standards

Introduction

The North Dakota Department of Career and Technical Education is committed to working on standards to ensure that each program area can offer courses that allow students to acquire knowledge and skills. CTE not only provides technical skills and knowledge for students to succeed in careers, but also cross-functional workplace skills such as teamwork, problem solving, and the ability to find and use information, and provides the context in which traditional educational goals and academic skills can be enhanced.

The standards process is one that directly involves the state supervisor(s), the curriculum administrator for this agency, and teachers working directly with the content at hand. Once the standards are written and expectations are clearly defined, the standards are then compared and aligned with national and industry standards.

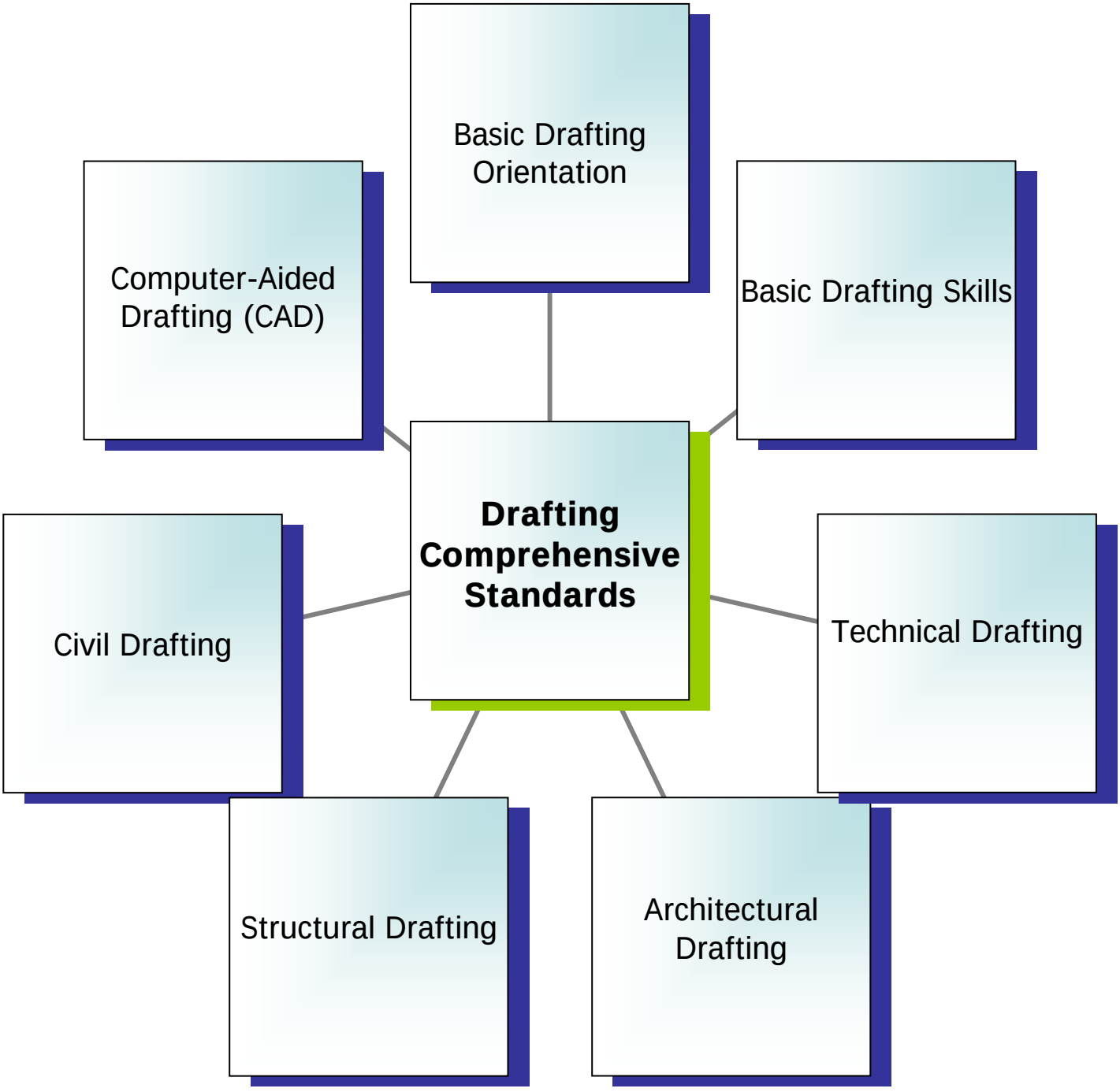
The Department of Career and Technical Education strongly believes in the importance of academic integration within each program area. The standards produced for each program area will be cross walked with the most current academic drafts of English Language Arts, Mathematics, and Science. When possible, standards will be cross walked with other academic areas that correspond.

Definitions

For each standard, there is one or more topic statements along with competencies for each topic. The competencies are categorized into three divisions: Introductory, Core, and Advanced. These divisions can further be defined as:

Introductory:	Knowledge Acquisition—Learners at this level expand awareness and build comprehension of knowledge.
Core:	Application—Learners at this level experience acquired knowledge by applying it to situations and self.
Advanced:	Reflection—Learners at this level analyze, synthesize, judge, assess, and evaluate knowledge in accord with their own goals, values, and beliefs, and/or real situations.

Overview of Standards



Standards at a Glance

COMPREHENSIVE STANDARDS

1.0 BASIC DRAFTING ORIENTATION
- Recognize basic concepts and skills of drafting.

2.0 BASIC DRAFTING SKILLS
- Implement concepts, skills, and techniques for basic drafting.

3.0 TECHNICAL DRAFTING
- Identify and apply concepts, skills, and techniques of technical drafting.

4.0 ARCHITECHURAL DRAFTING
- Articulate concepts, skills, and techniques of architectural drafting.

5.0 STRUCTURAL DRAFTING
- Identify and apply concepts, skills, and techniques of structural drafting.

6.0 CIVIL DRAFTING
- Identify and apply concepts, skills, and techniques of civil drafting.

7.0 COMPUTER-AIDED DRAFTING (CAD)
- Apply and perform CAD concepts, skills, and techniques within drawings.

Standard with Topics

CONTENT STANDARDS

1.0 BASIC DRAFTING ORIENTATION

- Recognize basic concepts and skills of drafting.
  - 1.1 Introduce drafting occupations.
  - 1.2 Develop and practice leadership skills.
  - 1.3 Demonstrate basic use of drafting tools.
  - 1.4 Employ drafting board equipment.

2.0 BASIC DRAFTING SKILLS

- Identify and apply concepts, skills, and techniques of basic drafting.
  - 2.1 Reproduce acceptable industry lettering.
  - 2.2 Recognize media reproduction methods.
  - 2.3 Draw title block and borders.
  - 2.4 Employ the use of various drafting scales.
  - 2.5 Demonstrate sketching techniques.
  - 2.6 Apply geometric construction.
  - 2.7 Produce orthographic views.
  - 2.8 Apply the uses of sectional views.
  - 2.9 Examine and create pictorial views.
  - 2.10 Employ inking tools and techniques.

3.0 TECHNICAL DRAFTING

- Identify and apply concepts, skills, and techniques of technical drafting.
  - 3.1 Utilize tools and equipment for technical drafting.
  - 3.2 Access reference materials.
  - 3.3 Prepare layouts and working drawings.
  - 3.4 Construct Auxiliaries and Revolutions.
  - 3.5 Practice dimensioning and tolerancing.
  - 3.6 Implement symbols, fasteners, and hardware into designs.
  - 3.7 Produce presentation drawings.
  - 3.8 Examine material and specifications.
  - 3.9 Explore manufacturing processes.
  - 3.10 Layout pattern developments.
  - 3.11 Design power transmission.
  - 3.12 Develop fabrication drawings.

4.0 ARCHITECTURAL DRAFTING

- Articulate concepts, skills, and techniques of architectural drafting.
  - 4.1 Access reference materials.
  - 4.2 Integrate lettering and tools.
  - 4.3 Investigate site conditions.
  - 4.4 Organize a residential design.
  - 4.5 Implement structural systems and building materials.
  - 4.6 Design floor plans and elevations.
  - 4.7 Communicate dimensioning practices.
  - 4.8 Prepare foundation plans and detailed sections.
  - 4.9 Design details.
  - 4.10 Analyze and integrate HVAC, electrical, and plumbing systems.
  - 4.11 Prepare material specifications.
  - 4.12 Illustrate presentation drawings.

CONTENT STANDARDS CONTINUED…

5.0 STRUCTURAL DRAFTING

- Identify and apply concepts, skills, and techniques of structural drafting.
  - 5.1 Access reference materials.
  - 5.2 Create engineering drawings.

6.0 CIVIL DRAFTING

- Identify and apply concepts, skills, and techniques of civil drafting.
  - 6.1 Access reference materials.
  - 6.2 Create civil drawings.

7.0 COMPUTER-AIDED DRAFTING (CAD)

- Apply and perform CAD concepts, skills, and techniques within drawings
  - 7.1 Demonstrate basic computer skills.
  - 7.2 Set drawing parameters.
  - 7.3 Create and edit drawing entities.
  - 7.4 Practice viewing options.
  - 7.5 Use drawing aids.
  - 7.6 Apply printing/plotting commands.
  - 7.7 Utilize symbols and libraries.
  - 7.8 Apply and manipulate text and dimensioning.

Standard 1: Basic Drafting Orientation—Recognize basic concepts and skills of drafting.

Topic 1: Introduce Drafting Occupations

Student Competencies

Core

1.1.1 Explore careers in the drafting field.

1.1.2 Research influential contributors to the drafting industry

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard 1: Basic Drafting Orientation – Recognize basic concepts and skills of drafting.

Topic 2: Develop and practice leadership skills.

Student Competencies

Introductory

1.2.1 Identify the advantages of a "team" (e.g. peer coaching, cooperative learning exercises, etc.)

Core

1.2.2 Give presentations (for varied purposes, audiences, etc.)

1.2.3 Conduct a meeting (e.g. informal, Parliamentary procedure, etc.)

1.2.4 Investigate leadership/professional organizations (e.g. SkillsUSA, TSA, National Technical Honor, Society, etc.)

Advanced

1.2.5 Implement student-centered instruction opportunities (e.g. lab/equipment facilitation, safety instruction, etc.)

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
5. Integrity/Honesty→ Chooses ethical courses of action.

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 1: Basic Drafting Orientation – Recognize basic concepts and skills of drafting.

Topic 3: Demonstrate basic use of drafting tools.

Student Competencies

Introductory

1.3.1 Identify drafting tools.

1.3.2 Identify drafting media. (e.g. sheet size and stock, types of drawing materials, etc.)

1.3.3 Understand development of angles and angle increments (e.g. dividing a circle, protractor use, adjustable triangles, etc.)

Core

1.3.4 Practice proper care of drafting tools and safety.

1.3.5 Draft on a drawing medium (e.g. graphite, plastic lead, etc.)

1.3.6 Sharpen leads for drafting.

1.3.7 Use a compass to draw circles and arcs.

1.3.8 Investigate measurement techniques (e.g. dividers, scales, etc.)

1.3.9 Use an irregular curve to construct a curved line.

1.3.10 Implement drafting templates.

Keys to Employability

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 1: Basic Drafting Orientation – Recognize basic concepts and skills of drafting.

Topic 4: Employ drafting board equipment.

Student Competencies

Introductory

1.4.1 Identify board equipment possibilities (e.g. a parallel bar, adjustable triangle, protractor, vernier scale, V-track drafting machines, etc.)

Core

1.4.2 Operate board equipment (e.g. a parallel bar, adjustable triangle, protractor, vernier scale, V-track drafting machines, etc.)

1.4.3 Maintain board equipment (e.g. a parallel bar, adjustable triangle, protractor, vernier scale, V-track drafting machines, etc.)

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 1: Basic Drafting Orientation – Recognize basic concepts and skills of drafting.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.2	Formulate a preliminary thesis statement
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.3	Gather reliable information to support a thesis
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.4	Verify the quality, accuracy, and usefulness of information
9.2.7	Access prior knowledge to interpret meaning
10.2.1	Summarize information from nonfiction genres
11.2.3	Analyze details, facts, and concepts from nonfiction genres
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.2	Critique details, facts, and concepts from nonfiction genres
12.2.8	Use technical language/jargon to decipher meaning
9.3.6	Elaborate ideas through word choice and description using grade-level vocabulary
9.3.8	Use supporting details
9.3.11	Arrange paragraphs in a logical progression
9.3.12	Use technology; e.g., publishing software and graphic programs, to present written work
10.3.2	Defend a personal opinion using facts as support
10.3.3	Use prewriting techniques to generate ideas
10.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.3.6	Organize and write compositions for school and peers
10.3.7	Use a variety of supporting details
10.3.13	Use knowledge of sentence structure and sentence construction to edit and revise text
10.3.14	Use sentence reduction techniques to revise and edit compositions
11.3.1	Gather information supporting multiple sides of an issue
11.3.2	Organize the ideas and details of a composition according to purpose
11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.1	Write business or other formal documents, including resumes, scholarship letters, and letters of inquiry or complaint

English Language Arts

12.3.2	Write persuasive compositions, including structuring arguments logically, using rhetorical devices, defending positions with evidence, and addressing readers' concerns and biases
12.3.3	Organize the ideas and details of a composition according to purpose
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
9.4.1	Analyze the audience and adjust message and wording to suit purpose
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.4.5	Use critical listening skills
10.4.1	Analyze the audience and adjust message and wording to suit the purpose
10.4.2	Use appropriate body language in oral presentations
10.4.3	Formulate questions in response to a verbal message
11.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.2	Adapt to a variety of speaking and listening situations such as formal presentations, oral interpretations, and group discussions
12.4.2	Use tone, inflection, pitch, and emphasis effectively in oral presentations
12.4.3	Analyze the audience and adjust message and wording to suit the audience while speaking
12.4.5	Use oral composition techniques to perform speeches such as memorized speeches, impromptu and extemporaneous, persuasive/argumentative, and expository speeches
9.5.1	Identify existing and developing media
9.5.2	Access media for a variety of purposes
9.5.3	Compare and contrast a written work and a media version
10.5.1	Identify existing and developing media
10.5.2	Use media for a variety of purposes
11.5.1	Identify existing and developing media
11.5.2	Apply media for a variety of purposes
12.5.2	Create a media project for a purpose
12.5.5	Examine advanced media techniques, e.g., music and sound, camera angles, lighting, and aesthetic effects
9.6.3	Use conventions of punctuation
9.6.6	Interpret symbolism
12.6.1	Use conventions of grammar, usage, and punctuation to edit and revise

Standard 1: Basic Drafting Orientation – Recognize basic concepts and skills of drafting.

Academic Cross Walk

Library/Technology Literacy

12.1.1	Define a research problem or task.
12.1.2	Plan a research strategy.
12.1.3	Access information using a variety of sources.
12.1.4	Use a variety of criteria to evaluate and select information for research.
12.1.5	Use organizational strategies to record and synthesize information.
12.1.6	Present research.
12.1.7	Evaluate the research process.
12.2.1	Demonstrate awareness of audience when creating media products.
12.2.2	Synthesize information to create a product that meets a specific need.
12.2.3	Use a variety of criteria to evaluate media products.
12.2.4	Use a variety of media and technology to communicate with communities beyond the school.
12.4.1	Work cooperatively and collaboratively when using media and technology.
12.4.2	Develop competence and selectivity in reading, listening, and viewing.
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment.
12.5.1	Follow school policies for responsible use of information resources.
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format.
12.5.4	Understand the impact of equitable access to information in a democracy.

Mathematics

9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.2.7	Identify and perform transformations of objects in the plane using sketches (translations, reflections, rotations, dilations) and coordinates (translations, reflections, dilations)
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.14	Draw conclusions about a situation being modeled

Standard 1: Basic Drafting Orientation – Recognize basic concepts and skills of drafting.

Academic Cross Walk

Science

9-10.6.3	Know how emerging technologies may impact society and the environment
11-12.6.1	Select and use appropriate technologies, tools, and techniques to solve a problem

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 1: Reproduce acceptable industry lettering

Student Competencies

Core

2.1.1 Select and sharpen lead correctly.

2.1.2 Operate an AMES type lettering guide to construct guidelines.

2.1.3 Demonstrate various lettering techniques. (e.g. vertical and inclined Gothic lettering and numerals, etc.)

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 2: Recognize media reproduction methods.

Student Competencies

Introductory

2.2.1 Explore various media reproduction methods. (e.g. diazo, photocopy, black line, blue line, etc.)

2.2.2 Learn to interpret a material safety data sheet (MSDS)

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 3: Draw title block and borders.

Student Competencies

Introductory

2.3.1 Investigate various title block layouts

Core

2.3.2 Complete title block sheets for various layouts.

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 4: Employ the use of various drafting scales.

Student Competencies

Introductory

2.4.1 Interpret graduations of scales. (e.g. architect, civil engineer, mechanical engineer, metric, etc.)

Core

2.4.2 Read and use scales. (e.g. architect, civil engineer, mechanical engineer, metric, etc.)

Keys to Employability

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 5: Demonstrate sketching techniques.

Student Competencies

Introductory

2.5.1 Introduce various sketching techniques.

Core

2.5.2 Sketch straight lines, arcs, circles, and an ellipsis.

2.5.3 Sketch an object using arcs and circles.

2.5.4 Sketch orthographic and pictorial views.

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 6: Apply geometric construction.

Student Competencies

Core

2.6.1 Bisect a line, an arc, and an angle.

2.6.2 Draw parallel lines.

2.6.3 Construct a perpendicular line; to a line from a point; and through a point on a line.

2.6.4 Divide a line into equal parts.

2.6.5 Draw an arc tangent (e.g. to a straight line, an arc, and to two arcs, to an acute angle and an obtuse angle, to a right angle, etc.)

2.6.6 Construct a triangle (e.g. with sides given, right triangle, an equilateral triangle with one side given, etc.)

2.6.7 Inscribe and circumscribe a hexagon.

2.6.8 Construct a circle through three given points.

2.6.9 Construct a pentagon by inscribing.

2.6.10 Draw an involute of a circle.

2.6.11 Draw an ellipse using the approximate ellipse with compass method.

2.6.12 Draw a parabola.

2.6.13 Join two points with a parabolic curve

Keys to Employability

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 7: Produce orthographic views.

Student Competencies

Introductory

2.7.1 Identify types of planes and projection lines in orthographic views.

2.7.2 Identify points and planes in orthographic views.

Core

2.7.3 Complete multi-view drawings (e.g. top, front, right side, including missing, visible, and hidden lines, etc.)

2.7.4 Construct multi-view drawings (e.g. top, front, right side, etc.)

2.7.5 Construct circles and arcs (e.g. using templates or construction methods.)

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
5. Integrity/Honesty→ Chooses ethical courses of action.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 8: Apply the uses of sectional views.

Student Competencies

Introductory

2.8.1 Identify various section views in relation to industry.

Core

2.8.2 Illustrate the various material symbols in sections.

2.8.3 Construct various section views of an object (e.g. top, half, offset, broken-out, removed, and revolved.)

2.8.4 Construct conventional breaks.

Advanced

2.8.5 Construct sections of an object with ribs, holes, spokes (aligned and/or adjacent).

2.8.6 Construct an assembly section.

2.8.7 Construct an isometric section.

Keys to Employability

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 9: Examine and create pictorial views.

Student Competencies

Introductory

2.9.1 Identify different pictorial views used in various industries.

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Topic 10: Employ inking tools and techniques

Student Competencies

Advanced

2.10.1 Identify steps in inking a drawing or a tracing

2.10.2 Draw and edit ink lines

2.10.3 Use and maintain technical and pocket model pens.

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Academic Cross Walk

English Language Arts

9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
9.2.7	Access prior knowledge to interpret meaning
10.2.1	Summarize information from nonfiction genres
11.2.3	Analyze details, facts, and concepts from nonfiction genres
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.2	Critique details, facts, and concepts from nonfiction genres
12.2.8	Use technical language/jargon to decipher meaning
9.3.11	Arrange paragraphs in a logical progression
10.3.3	Use prewriting techniques to generate ideas
10.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.3.6	Organize and write compositions for school and peers
10.3.7	Use a variety of supporting details
10.3.13	Use knowledge of sentence structure and sentence construction to edit and revise text
10.3.14	Use sentence reduction techniques to revise and edit compositions
11.3.1	Gather information supporting multiple sides of an issue
11.3.2	Organize the ideas and details of a composition according to purpose
11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.1	Write business or other formal documents, including resumes, scholarship letters, and letters of inquiry or complaint
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
9.4.1	Analyze the audience and adjust message and wording to suit purpose
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.4.5	Use critical listening skills

English Language Arts

10.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.2	Adapt to a variety of speaking and listening situations such as formal presentations, oral interpretations, and group discussions
12.4.2	Use tone, inflection, pitch, and emphasis effectively in oral presentations
12.4.3	Analyze the audience and adjust message and wording to suit the audience while speaking
12.4.5	Use oral composition techniques to perform speeches such as memorized speeches, impromptu and extemporaneous, persuasive/argumentative, and expository speeches
9.5.1	Identify existing and developing media
9.5.2	Access media for a variety of purposes
9.5.3	Compare and contrast a written work and a media version
10.5.1	Identify existing and developing media
10.5.2	Use media for a variety of purposes
11.5.1	Identify existing and developing media
11.5.2	Apply media for a variety of purposes
12.5.2	Create a media project for a purpose
12.5.5	Examine advanced media techniques, e.g., music and sound, camera angles, lighting, and aesthetic effects
9.6.3	Use conventions of punctuation
9.6.6	Interpret symbolism
12.6.1	Use conventions of grammar, usage, and punctuation to edit and revise

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Academic Cross Walk

Library/Technology Literacy

12.1.3	Access information using a variety of sources.
12.2.2	Synthesize information to create a product that meets a specific need.
12.4.1	Work cooperatively and collaboratively when using media and technology.
12.4.2	Develop competence and selectivity in reading, listening, and viewing.
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment.
12.5.1	Follow school policies for responsible use of information resources.
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format.

Mathematics

9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.4	Justify the steps of an algebraic process using the properties of the real number system
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.2.1	Identify the properties and attributes of two- and three-dimensional objects that distinguish one from another
9-10.2.2	Determine congruence and similarity among geometric objects
9-10.2.5	Use Cartesian coordinates to determine distance, midpoint, and slope
9-10.2.6	Use distance, midpoint, and slope to determine relationships between points, lines, and plane figures in the Cartesian coordinate system
9-10.2.7	Identify and perform transformations of objects in the plane using sketches (translations, reflections, rotations, dilations) and coordinates (translations, reflections, dilations)
9-10.2.10	Recognize images of the same object shown from different perspectives
9-10.2.11	Use geometric models to find solutions to problems in mathematics and other disciplines,
11-12.2.1	Use trigonometric relationships to determine side lengths and angle measures in triangles
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled

Standard 2: Drafting Skills – Implement concepts, skills, and techniques for basic drafting.

Academic Cross Walk

Science

9-10.6.3	Know how emerging technologies may impact society and the environment
11-12.6.1	Select and use appropriate technologies, tools, and techniques to solve a problem

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 1: Utilize tools and equipment for technical drafting.

Student Competencies

Core

3.1.1 Read and use various measuring equipment (e.g. micrometer, vernier calipers, scale, etc.)

Advanced

3.1.2 Use various applications to compute technical drafting problems (computer, calculator, etc.)

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 2: Access reference materials.

Student Competencies

Core

3.2.1 Determine manufacturer of technical components from Thomas Register.

3.2.2 Explore ways to locate product literature and reference materials for technical components.

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 3: Prepare layouts and working drawings.

Student Competencies

Core

3.3.1 Draw a design layout, a set of detail drawings, and an assembly drawing.

3.3.2 Complete a detailed title block and revision block.

3.3.3 Complete a parts list.

3.3.4 Make a drawing revision.

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 4: Construct Auxiliaries and Revolutions.

Student Competencies

Core

3.4.1 Label points and planes of a three view object.

3.4.2 Construct a primary auxiliary of an inclined plane.

3.4.3 Construct a true size auxiliary of a curved surface.

Advanced

3.4.4 Construct a true length of an oblique line.

3.4.5 Determine the true angle and slope of a line.

3.4.6 Determine the true angle between two planes.

3.4.7 Determine the visibility of lines in space and a plane that cross.

3.4.8 Locate piercing point of a line and a plane.

3.4.9 Construct a secondary auxiliary view of an object.

3.4.10 Construct a point view of a line.

3.4.11 Determine true angle between two planes in a secondary auxiliary.

3.4.12 Construct a true size auxiliary of an oblique plane.

3.4.13 Determine shortest distance between a point and a line.

3.4.14 Determine shortest distance between two skew lines.

Keys to Employability

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 5: Practice dimensioning and tolerancing.

Student Competencies

Introductory

3.5.1 Introduce basic concepts of geometric dimensioning and Tolerancing (GDT).

Core

3.5.2 Dimension a variety of geometric objects accurately.

3.5.3 Interpret decimal tolerance dimensions.

3.5.4 Dimension and calculate tolerances using standard fit tables.

3.5.5 Determine ranges of motion of limbs and spaces required for a person.

3.5.6 Dimension a theoretical point of intersection.

3.5.7 Dimension geometric shapes using various coordinate systems (e.g. rectangular coordinate, polar coordinate, tabular coordinate, ordinate dimensioning)

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
5. Integrity/Honesty→ Chooses ethical courses of action.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 6: Implement symbols, fasteners, and hardware into designs.

Student Competencies

Core

3.6.1 Construct various symbols, fasteners, and hardware. (e.g. bolts, screws, nuts, thread symbols, etc.)

3.6.2 Apply welding symbols to a drawing.

3.6.3 Construct a spring drawing to include specifications.

3.6.4 Construct keys in assembled positions.

Advanced

3.6.5 Select specifications for hardware from vendor resources.

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 7: Produce presentation drawings.

Student Competencies

Core

3.7.1 Shade pictorials

3.7.2 Construct conceptual presentation and design sketches.

3.7.3 Construct various presentation drawings (e.g. diametric, oblique, two-point perspective, and exploded assembly.)

Keys to Employability

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 8: Examine material and specifications.

Student Competencies

Core

3.8.1 Determine wire and sheet metal size from gage number.

3.8.2 Select materials, shapes, sizes, and types from trade journals.

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 9: Explore manufacturing processes.

Student Competencies

Introductory

3.9.1 List manufacturing process information.

Core

3.9.2 Calculate bend allowance for sheet metal.

3.9.3 Design a casted, forged, welded, and thermoplastic part.

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic10: Layout pattern developments.

Student Competencies

Introductory

3.10.1 Identify true lengths, sizes, and types of lines and planes.

Core

3.10.2 Label points, lines, and places in views.

3.10.3 Construct true lengths, sizes, and types of lines and planes by rotation.

3.10.4 Construct intersections of surfaces.

3.10.5 Construct radial and parallel line developments.

3.10.6 Construct special developments using triangulation.

Advanced

3.10.7 Construct lengths of lines and true sizes of planes using auxiliary views.

3.10.8 Construct intersections of surfaces using two-view method.

3.10.9 Locate elements of single curved surfaces

Keys to Employability

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 11: Design power transmission.

Student Competencies

Core

3.11.1 Construct various gear drawings (e.g. spur, bevel, worm, etc.)

3.11.2 Calculate and determine gear ratios, rotation, and speed.

3.11.3 Construct a cam drawing.

3.11.4 Select a chain drive, V-belt drive, and types of bearings from handbooks.

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Topic 12: Develop fabrication drawings.

Student Competencies

Core

3.12.1 Create a set of detailed fabrication drawings for an actual project.

3.12.2 Generate a presentation drawing for an actual project.

Keys to Employability

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.2	Formulate a preliminary thesis statement
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.3	Gather reliable information to support a thesis
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.4	Verify the quality, accuracy, and usefulness of information
9.2.7	Access prior knowledge to interpret meaning
10.2.1	Summarize information from nonfiction genres
11.2.3	Analyze details, facts, and concepts from nonfiction genres
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.2	Critique details, facts, and concepts from nonfiction genres
12.2.8	Use technical language/jargon to decipher meaning
9.3.6	Elaborate ideas through word choice and description using grade-level vocabulary
9.3.8	Use supporting details
9.3.11	Arrange paragraphs in a logical progression
9.3.12	Use technology; e.g., publishing software and graphic programs, to present written work
10.3.2	Defend a personal opinion using facts as support
10.3.3	Use prewriting techniques to generate ideas
10.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.3.6	Organize and write compositions for school and peers
10.3.7	Use a variety of supporting details
10.3.13	Use knowledge of sentence structure and sentence construction to edit and revise text
10.3.14	Use sentence reduction techniques to revise and edit compositions
11.3.1	Gather information supporting multiple sides of an issue
11.3.2	Organize the ideas and details of a composition according to purpose
11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.1	Write business or other formal documents, including resumes, scholarship letters, and letters of inquiry or complaint

English Language Arts

12.3.2	Write persuasive compositions, including structuring arguments logically, using rhetorical devices, defending positions with evidence, and addressing readers' concerns and biases
12.3.3	Organize the ideas and details of a composition according to purpose
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
9.4.1	Analyze the audience and adjust message and wording to suit purpose
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.4.5	Use critical listening skills
10.4.1	Analyze the audience and adjust message and wording to suit the purpose
10.4.2	Use appropriate body language in oral presentations
10.4.3	Formulate questions in response to a verbal message
11.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.2	Adapt to a variety of speaking and listening situations such as formal presentations, oral interpretations, and group discussions
12.4.2	Use tone, inflection, pitch, and emphasis effectively in oral presentations
12.4.3	Analyze the audience and adjust message and wording to suit the audience while speaking
12.4.5	Use oral composition techniques to perform speeches such as memorized speeches, impromptu and extemporaneous, persuasive/argumentative, and expository speeches
9.5.1	Identify existing and developing media
9.5.2	Access media for a variety of purposes
9.5.3	Compare and contrast a written work and a media version
10.5.1	Identify existing and developing media
10.5.2	Use media for a variety of purposes
11.5.1	Identify existing and developing media
11.5.2	Apply media for a variety of purposes
12.5.2	Create a media project for a purpose
12.5.5	Examine advanced media techniques, e.g., music and sound, camera angles, lighting, and aesthetic effects
9.6.3	Use conventions of punctuation
9.6.6	Interpret symbolism
12.6.1	Use conventions of grammar, usage, and punctuation to edit and revise

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Academic Cross Walk

Library/Technology Literacy

12.1.3	Access information using a variety of sources
12.2.2	Synthesize information to create a product that meets a specific need
12.4.1	Work cooperatively and collaboratively when using media and technology
12.4.2	Develop competence and selectivity in reading, listening, and viewing
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment
12.5.1	Follow school policies for responsible use of information resources
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format

Mathematics

9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.4	Justify the steps of an algebraic process using the properties of the real number system
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.2.1	Identify the properties and attributes of two- and three-dimensional objects that distinguish one from another
9-10.2.2	Determine congruence and similarity among geometric objects
9-10.2.3	Use trigonometric relationships and the Pythagorean Theorem to determine side lengths and angle measures in right triangles
9-10.2.5	Use Cartesian coordinates to determine distance, midpoint, and slope
9-10.2.6	Use distance, midpoint, and slope to determine relationships between points, lines, and plane figures in the Cartesian coordinate system
9-10.2.7	Identify and perform transformations of objects in the plane using sketches (translations, reflections, rotations, dilations) and coordinates (translations, reflections, dilations)
9-10.2.8	Describe the effects of combining basic transformations in a plane
9-10.2.9	Construct plane figures using traditional and/or technological tools
9-10.2.10	Recognize images of the same object shown from different perspectives
9-10.2.11	Use geometric models to find solutions to problems in mathematics and other disciplines
11-12.2.1	Use trigonometric relationships to determine side lengths and angle measures in triangles
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement

Standard 3: Technical Drafting—Identify and apply concepts, skills, and techniques of technical drafting.

Academic Cross Walk

Mathematics (cont.)

9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.6	Draw graphs of linear and quadratic functions using paper and pencil, labeling key features
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled

Science

9-10.6.3	Know how emerging technologies may impact society and the environment
11-12.6.1	Select and use appropriate technologies, tools, and techniques to solve a problem

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 1: Access reference materials.

Student Competencies

Introductory

4.1.1 Explore various architectural reference materials.

Core

4.1.2 Use industry reference materials such as Sweet's, Graphic Standards, building codes, and trade journals.

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 2: Access reference materials.

Student Competencies

Core

4.2.1 Select and sharpen lead correctly.

4.2.2 Letter using a variety of styles (e.g. condensed, extended, variation, kabel modern, chisel, triangle, and shadow)

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 3: Investigate site conditions.

Student Competencies

Introductory

4.3.1 Compile a list of site considerations.

Core

4.3.2 Evaluate site considerations.

4.3.3 Draw a site and/or plot plan based on site considerations.

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 4: Organize a residential design.

Student Competencies

Introductory

4.4.1 Explore Architectural style and types.

4.4.2 Identify design factors (e.g. living, sleeping, service area, traffic patterns, and storage facilities.)

Core

4.4.3 Determine client needs.

4.4.4 Develop a preliminary residential sketch.

4.4.5 Evaluate different architectural styles and types.

4.4.6 Implement design factors into a design (e.g. living, sleeping, service area, traffic patterns, and storage facilities.)

4.4.7 Apply codes to designs.

Advanced

4.4.8 Construct a model

4.4.9 Construct a 3-D CAD model.

4.4.10 Apply rendering techniques to 3-D CAD model.

Keys to Employability

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 5: Implement structural systems and building materials.

Student Competencies

Introductory

4.5.1 Identify structural elements (e.g. wood floor joists, roof rafters, wood girders, steel beams, exterior or interior wall headers, etc.)

Advanced

4.5.2 Determine sizes of structural elements (e.g. wood floor joists, roof rafters, wood girders, steel beams, exterior or interior wall headers, etc.)

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 6: Design floor plans and elevations.

Student Competencies

Core

4.6.1 Draw a floor plan from a preliminary sketch.

4.6.2 Generate two different elevations of the same floor plan.

4.6.3 Apply different roof styles to an elevation.

4.6.4 Draw a front and side elevations using various terrains.

4.6.5 Complete a door and window schedule.

Keys to Employability

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 7: Communicate dimensioning practices.

Student Competencies

Introductory

4.7.1 Identify architectural dimensioning styles and methods.

Core

4.7.2 Apply dimensioning to working drawings (e.g. floor plans, elevations, sections, details, etc.)

Advanced

4.7.3 Convert floor and elevation plans to metric.

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 8: Prepare foundation plans and detailed sections.

Student Competencies

Introductory

4.8.1 Introduce foundation systems.

Core

4.8.2 Determine various foundation and footing requirements for a residential structure. (e.g. continuous, column, slab, etc

4.8.3 Draw a foundation plan.

4.8.4 Create foundation sections with detail.

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 9: Design details.

Student Competencies

Core

4.9.1 Draw a wall section detail.

Advanced

4.9.2 Construct a stairway layout.

4.9.3 Draw fireplace construction details.

4.9.4 Draw typical cabinet details.

4.9.5 Draw door and window section details.

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
5. Integrity/Honesty→ Chooses ethical courses of action.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 10: Analyze and integrate HVAC, electrical, and plumbing systems.

Student Competencies

Introductory

4.10.1 Define HVAC components.

4.10.2 Define electrical components.

4.10.3 Define plumbing components.

Core

4.10.4 Draw an HVAC plan for a design project.

4.10.5 Draw an electrical plan for a design project.

4.10.6 Incorporate plumbing fixtures into working drawings.

4.10.7 Implement applicable codes to a design project. (e.g. NEC, ASHRAE, etc.)

Advanced

4.10.8 Estimate heat loss/gain for a residence.

4.10.9 Calculate shaded and unshaded glass areas for use in heat gain estimates.

4.10.10 Evaluate the addition of insulation in relation to heat loss and heat gain.

4.10.11 Calculate the size of a building sewer line.

4.10.12 Construct plumbing drawings for a variety of systems (e.g. building drain system, residential building, etc.)

4.10.13 Design a septic system

Keys to Employability

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 11: Prepare material specifications.

Student Competencies

Introductory

4.11.1 Explore various building material specifications.

4.11.2 Discuss ADA (Americans with Disabilities Act) requirements.

Core

4.11.3 Determine materials used in residential construction using Sweet's Catalog file.

Advanced

4.11.4 Fill in a VA-FHA "Description of Materials" form

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Topic 12: Illustrate presentation drawings.

Student Competencies

Introductory

4.12.1 Review perspective terms.

4.12.2 Introduce presentation methods.

Core

4.12.3 Draw one-point and/or two-point perspectives.

4.12.4 Apply shade and shadow to various objects.

4.12.5 Render an elevation and/or perspective.

Advanced

4.12.6 Implement color applications to a design.

Keys to Employability

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.2	Formulate a preliminary thesis statement
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.3	Gather reliable information to support a thesis
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.4	Verify the quality, accuracy, and usefulness of information
9.2.7	Access prior knowledge to interpret meaning
10.2.1	Summarize information from nonfiction genres
11.2.3	Analyze details, facts, and concepts from nonfiction genres
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.2	Critique details, facts, and concepts from nonfiction genres
12.2.8	Use technical language/jargon to decipher meaning
9.3.6	Elaborate ideas through word choice and description using grade-level vocabulary
9.3.8	Use supporting details
9.3.11	Arrange paragraphs in a logical progression
9.3.12	Use technology; e.g., publishing software and graphic programs, to present written work
10.3.2	Defend a personal opinion using facts as support
10.3.3	Use prewriting techniques to generate ideas
10.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.3.6	Organize and write compositions for school and peers
10.3.7	Use a variety of supporting details
10.3.13	Use knowledge of sentence structure and sentence construction to edit and revise text
10.3.14	Use sentence reduction techniques to revise and edit compositions
11.3.1	Gather information supporting multiple sides of an issue
11.3.2	Organize the ideas and details of a composition according to purpose
11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.1	Write business or other formal documents, including resumes, scholarship letters, and letters of inquiry or complaint

English Language Arts

12.3.2	Write persuasive compositions, including structuring arguments logically, using rhetorical devices, defending positions with evidence, and addressing readers' concerns and biases
12.3.3	Organize the ideas and details of a composition according to purpose
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
9.4.1	Analyze the audience and adjust message and wording to suit purpose
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.4.5	Use critical listening skills
10.4.1	Analyze the audience and adjust message and wording to suit the purpose
10.4.2	Use appropriate body language in oral presentations
10.4.3	Formulate questions in response to a verbal message
11.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.2	Adapt to a variety of speaking and listening situations such as formal presentations, oral interpretations, and group discussions
12.4.2	Use tone, inflection, pitch, and emphasis effectively in oral presentations
12.4.3	Analyze the audience and adjust message and wording to suit the audience while speaking
12.4.5	Use oral composition techniques to perform speeches such as memorized speeches, impromptu and extemporaneous, persuasive/argumentative, and expository speeches
9.5.1	Identify existing and developing media
9.5.2	Access media for a variety of purposes
9.5.3	Compare and contrast a written work and a media version
10.5.1	Identify existing and developing media
10.5.2	Use media for a variety of purposes
11.5.1	Identify existing and developing media
11.5.2	Apply media for a variety of purposes
12.5.2	Create a media project for a purpose
12.5.5	Examine advanced media techniques, e.g., music and sound, camera angles, lighting, and aesthetic effects
9.6.3	Use conventions of punctuation
9.6.6	Interpret symbolism
12.6.1	Use conventions of grammar, usage, and punctuation to edit and revise

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Academic Cross Walk

Library/Technology Literacy

12.1.3	Access information using a variety of sources.
12.2.2	Synthesize information to create a product that meets a specific need.
12.4.1	Work cooperatively and collaboratively when using media and technology.
12.4.2	Develop competence and selectivity in reading, listening, and viewing.
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment.
12.5.1	Follow school policies for responsible use of information resources.
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format.

Mathematics

9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.2.6	Use distance, midpoint, and slope to determine relationships between points, lines, and plane figures in the Cartesian coordinate system
9-10.2.7	Identify and perform transformations of objects in the plane using sketches (translations, reflections, rotations, dilations) and coordinates (translations, reflections, dilations)
9-10.2.10	Recognize images of the same object shown from different perspectives
9-10.2.11	Use geometric models to find solutions to problems in mathematics and other disciplines
11-12.2.1	Use trigonometric relationships to determine side lengths and angle measures in triangles
9-10.3.10	Identify the trend of a set of data and estimate the strength of the correlation between two variables
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled
9-10.5.15	Approximate and interpret rates of change from graphical and numerical data

Standard 4: Architectural Drafting – Articulate concepts, skills, and techniques of architectural drafting.

Academic Cross Walk

Science

9-10.1.1	Understand the interaction of components within a system
9-10.1.3	Understand the relationship between form and function
9-10.1.4	Know how classification can be based on the relationship between form and function
9-10.1.5	Understand principles governing evolution and equilibrium within systems
9-10.1.6	Explain how models can be used to illustrate scientific principles
11-12.1.3	Understand the relationship between form and function
11-12.1.5	Understand principles governing evolution and equilibrium within systems
11-12.1.6	Understand how scientists create and use models to address scientific knowledge
9-10.2.2	Identify questions and concepts that guide scientific investigations
9-10.2.3	Formulate a testable hypothesis for a simple investigation
9-10.2.4	Identify the independent and dependent variables, the control, and the constants when conducting an experiment
9-10.2.5	Design and conduct a guided investigation
9-10.2.6	Maintain clear and accurate records of scientific investigations
9-10.2.7	Analyze data found in tables, charts, and graphs to formulate conclusions
9-10.2.8	Understand that scientific investigations sometimes result in new ideas
11-12.2.2	Select and use appropriate instruments, measuring tools, and units of measure to improve scientific investigations
11-12.2.3	Use data from scientific investigations in order to accept or reject a hypothesis
11-12.2.4	Formulate and revise explanations based upon scientific knowledge and experimental data
11-12.2.5	Use technology and mathematics to improve investigations and communications
11-12.2.6	Analyze data using appropriate strategies
11-12.2.7	Design and conduct an independent investigation
11-12.2.8	Communicate and defend a scientific argument
9-10.5.3	Know the basic characteristics of the Earth
9-10.6.3	Know how emerging technologies may impact society and the environment

Science (cont.)

9-10.6.3	Know how emerging technologies may impact society and the environment
11-12.6.1	Select and use appropriate technologies, tools, and techniques to solve a problem

Standard 5: Structural Drafting – Identify and apply concepts, skills, and techniques of structural drafting.

Topic 1: Access reference materials.

Student Competencies

Core

5.1.1 Utilize reference books to identify structural components.

5.1.2 Identify various structural terminologies.

5.1.3 Research career opportunities

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
5. Integrity/Honesty→ Chooses ethical courses of action.

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 5: Structural Drafting – Identify and apply concepts, skills, and techniques of structural drafting.

Topic 2: Create engineering drawings.

Student Competencies

Core

5.2.1 Complete various structural drawings (e.g. framing plans, structural details, sections, etc.)

5.2.2 Apply notes and dimensions as needed to drawings.

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 5: Structural Drafting – Identify and apply concepts, skills, and techniques of structural drafting.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.2	Formulate a preliminary thesis statement
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.3	Gather reliable information to support a thesis
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.4	Verify the quality, accuracy, and usefulness of information
9.2.7	Access prior knowledge to interpret meaning
10.2.1	Summarize information from nonfiction genres
11.2.3	Analyze details, facts, and concepts from nonfiction genres
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.2	Critique details, facts, and concepts from nonfiction genres
12.2.8	Use technical language/jargon to decipher meaning
9.3.6	Elaborate ideas through word choice and description using grade-level vocabulary
9.3.8	Use supporting details
9.3.11	Arrange paragraphs in a logical progression
9.3.12	Use technology; e.g., publishing software and graphic programs, to present written work
10.3.2	Defend a personal opinion using facts as support
10.3.3	Use prewriting techniques to generate ideas
10.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.3.6	Organize and write compositions for school and peers
10.3.7	Use a variety of supporting details
10.3.13	Use knowledge of sentence structure and sentence construction to edit and revise text
10.3.14	Use sentence reduction techniques to revise and edit compositions
11.3.1	Gather information supporting multiple sides of an issue
11.3.2	Organize the ideas and details of a composition according to purpose
11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.1	Write business or other formal documents, including resumes, scholarship letters, and letters of inquiry or complaint

English Language Arts

12.3.2	Write persuasive compositions, including structuring arguments logically, using rhetorical devices, defending positions with evidence, and addressing readers' concerns and biases
12.3.3	Organize the ideas and details of a composition according to purpose
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
9.4.1	Analyze the audience and adjust message and wording to suit purpose
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.4.5	Use critical listening skills
10.4.1	Analyze the audience and adjust message and wording to suit the purpose
10.4.2	Use appropriate body language in oral presentations
10.4.3	Formulate questions in response to a verbal message
11.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.2	Adapt to a variety of speaking and listening situations such as formal presentations, oral interpretations, and group discussions
12.4.2	Use tone, inflection, pitch, and emphasis effectively in oral presentations
12.4.3	Analyze the audience and adjust message and wording to suit the audience while speaking
12.4.5	Use oral composition techniques to perform speeches such as memorized speeches, impromptu and extemporaneous, persuasive/argumentative, and expository speeches
9.5.1	Identify existing and developing media
9.5.2	Access media for a variety of purposes
9.5.3	Compare and contrast a written work and a media version
10.5.1	Identify existing and developing media
10.5.2	Use media for a variety of purposes
11.5.1	Identify existing and developing media
11.5.2	Apply media for a variety of purposes
12.5.2	Create a media project for a purpose
12.5.5	Examine advanced media techniques, e.g., music and sound, camera angles, lighting, and aesthetic effects
9.6.3	Use conventions of punctuation
9.6.6	Interpret symbolism
12.6.1	Use conventions of grammar, usage, and punctuation to edit and revise

Standard 5: Structural Drafting – Identify and apply concepts, skills, and techniques of structural drafting.

Academic Cross Walk

Library/Technology Literacy

12.1.3	Access information using a variety of sources.
12.2.2	Synthesize information to create a product that meets a specific need.
12.4.1	Work cooperatively and collaboratively when using media and technology.
12.4.2	Develop competence and selectivity in reading, listening, and viewing.
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment.
12.5.1	Follow school policies for responsible use of information resources.
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format.

Mathematics

9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.3.10	Identify the trend of a set of data and estimate the strength of the correlation between two variables
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled
9-10.4.15	Approximate and interpret rates of change from graphical and numerical data

Standard 5: Structural Drafting – Identify and apply concepts, skills, and techniques of structural drafting.

Academic Cross Walk

Science

9-10.1.1	Understand the interaction of components within a system
9-10.1.3	Understand the relationship between form and function
9-10.1.4	Know how classification can be based on the relationship between form and function
9-10.1.5	Understand principles governing evolution and equilibrium within systems
9-10.1.6	Explain how models can be used to illustrate scientific principles
11-12.1.3	Understand the relationship between form and function
11-12.1.5	Understand principles governing evolution and equilibrium within systems
11-12.1.6	Understand how scientists create and use models to address scientific knowledge
9-10.2.2	Identify questions and concepts that guide scientific investigations
9-10.2.3	Formulate a testable hypothesis for a simple investigation
9-10.2.4	Identify the independent and dependent variables, the control, and the constants when conducting an experiment
9-10.2.5	Design and conduct a guided investigation
9-10.2.6	Maintain clear and accurate records of scientific investigations
9-10.2.7	Analyze data found in tables, charts, and graphs to formulate conclusions
9-10.2.8	Understand that scientific investigations sometimes result in new ideas
11-12.2.2	Select and use appropriate instruments, measuring tools, and units of measure to improve scientific investigations
11-12.2.3	Use data from scientific investigations in order to accept or reject a hypothesis
11-12.2.4	Formulate and revise explanations based upon scientific knowledge and experimental data
11-12.2.5	Use technology and mathematics to improve investigations and communications
11-12.2.6	Analyze data using appropriate strategies
11-12.2.7	Design and conduct an independent investigation
11-12.2.8	Communicate and defend a scientific argument
9-10.5.3	Know the short-term and long-term effects of physical processes on the environment and society

Standard 6: Civil Drafting—Identify and apply concepts, skills, and techniques of civil drafting.

Topic 1: Access reference materials.

Student Competencies

Core

6.1.1 Identify various civil terms.

6.1.2 Research career opportunities.

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
5. Integrity/Honesty→ Chooses ethical courses of action.

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 6: Civil Drafting—Identify and apply concepts, skills, and techniques of civil drafting.

Topic 2: Create civil drawings.

Student Competencies

Core

6.2.1 Create civil drawings (e.g. open/closed traverse, contour map, profile, cut and fill, etc.)

6.2.2 Apply notes and dimensions as needed to drawings.

6.2.3 Identify various structural terminologies

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 6: Civil Drafting—Identify and apply concepts, skills, and techniques of civil drafting.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.2	Formulate a preliminary thesis statement
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.3	Gather reliable information to support a thesis
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.4	Verify the quality, accuracy, and usefulness of information
9.2.7	Access prior knowledge to interpret meaning
10.2.1	Summarize information from nonfiction genres
11.2.3	Analyze details, facts, and concepts from nonfiction genres
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.2	Critique details, facts, and concepts from nonfiction genres
12.2.8	Use technical language/jargon to decipher meaning
9.3.6	Elaborate ideas through word choice and description using grade-level vocabulary
9.3.8	Use supporting details
9.3.11	Arrange paragraphs in a logical progression
9.3.12	Use technology; e.g., publishing software and graphic programs, to present written work
10.3.2	Defend a personal opinion using facts as support
10.3.3	Use prewriting techniques to generate ideas
10.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.3.6	Organize and write compositions for school and peers
10.3.7	Use a variety of supporting details
10.3.13	Use knowledge of sentence structure and sentence construction to edit and revise text
10.3.14	Use sentence reduction techniques to revise and edit compositions
11.3.1	Gather information supporting multiple sides of an issue
11.3.2	Organize the ideas and details of a composition according to purpose
11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.1	Write business or other formal documents, including resumes, scholarship letters, and letters of inquiry or complaint

English Language Arts

12.3.2	Write persuasive compositions, including structuring arguments logically, using rhetorical devices, defending positions with evidence, and addressing readers' concerns and biases
12.3.3	Organize the ideas and details of a composition according to purpose
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
9.4.1	Analyze the audience and adjust message and wording to suit purpose
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.4.5	Use critical listening skills
10.4.1	Analyze the audience and adjust message and wording to suit the purpose
10.4.2	Use appropriate body language in oral presentations
10.4.3	Formulate questions in response to a verbal message
11.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.2	Adapt to a variety of speaking and listening situations such as formal presentations, oral interpretations, and group discussions
12.4.2	Use tone, inflection, pitch, and emphasis effectively in oral presentations
12.4.3	Analyze the audience and adjust message and wording to suit the audience while speaking
12.4.5	Use oral composition techniques to perform speeches such as memorized speeches, impromptu and extemporaneous, persuasive/argumentative, and expository speeches
9.5.1	Identify existing and developing media
9.5.2	Access media for a variety of purposes
9.5.3	Compare and contrast a written work and a media version
10.5.1	Identify existing and developing media
10.5.2	Use media for a variety of purposes
11.5.1	Identify existing and developing media
11.5.2	Apply media for a variety of purposes
12.5.2	Create a media project for a purpose
12.5.5	Examine advanced media techniques, e.g., music and sound, camera angles, lighting, and aesthetic effects
9.6.3	Use conventions of punctuation
9.6.6	Interpret symbolism
12.6.1	Use conventions of grammar, usage, and punctuation to edit and revise

Standard 6: Civil Drafting—Identify and apply concepts, skills, and techniques of civil drafting.

Academic Cross Walk

Library/Technology Literacy

12.1.3	Access information using a variety of sources.
12.2.2	Synthesize information to create a product that meets a specific need.
12.4.1	Work cooperatively and collaboratively when using media and technology.
12.4.2	Develop competence and selectivity in reading, listening, and viewing.
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment.
12.5.1	Follow school policies for responsible use of information resources.
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format.

Mathematics

9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.2.6	Use distance, midpoint, and slope to determine relationships between points, lines, and plane figures in the Cartesian coordinate system
9-10.3.10	Identify the trend of a set of data and estimate the strength of the correlation between two variables
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled
9-10.5.15	Approximate and interpret rates of change from graphical and numerical data

Standard 6: Civil Drafting—Identify and apply concepts, skills, and techniques of civil drafting.

Academic Cross Walk

Science

9-10.1.1	Understand the interaction of components within a system
9-10.1.3	Understand the relationship between form and function
9-10.1.4	Know how classification can be based on the relationship between form and function
9-10.1.5	Understand principles governing evolution and equilibrium within systems
9-10.1.6	Explain how models can be used to illustrate scientific principles
11-12.1.3	Understand the relationship between form and function
11-12.1.5	Understand principles governing evolution and equilibrium within systems
11-12.1.6	Understand how scientists create and use models to address scientific knowledge
9-10.2.2	Identify questions and concepts that guide scientific investigations
9-10.2.3	Formulate a testable hypothesis for a simple investigation
9-10.2.4	Identify the independent and dependent variables, the control, and the constants when conducting an experiment
9-10.2.5	Design and conduct a guided investigation
9-10.2.6	Maintain clear and accurate records of scientific investigations
9-10.2.7	Analyze data found in tables, charts, and graphs to formulate conclusions
9-10.2.8	Understand that scientific investigations sometimes result in new ideas
11-12.2.2	Select and use appropriate instruments, measuring tools, and units of measure to improve scientific investigations
11-12.2.3	Use data from scientific investigations in order to accept or reject a hypothesis
11-12.2.4	Formulate and revise explanations based upon scientific knowledge and experimental data
11-12.2.5	Use technology and mathematics to improve investigations and communications
11-12.2.6	Analyze data using appropriate strategies
11-12.2.7	Design and conduct an independent investigation
11-12.2.8	Communicate and defend a scientific argument
9-10.5.3	Know the short-term and long-term effects of physical processes on the environment and society

Standard 7: Computer-Aided Drafting (CAD) —Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 1: Demonstrate basic computer skills.

Student Competencies

Core

7.1.1 Integrate basic computer skills (e.g. file management, directory navigation, etc.)

7.1.2 Navigate within operating systems and applications.

7.1.3 Save files to various storage medias (e.g. HDD, FDD, CD, jump drives, etc.)

Advanced

7.1.4 Apply knowledge of utilities commands (e.g. purge, recover, audit, etc.)

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 2: Set drawing parameters.

Student Competencies

Core

7.2.1 Create new drawings from various template files.

7.2.2 Set up drawings from scratch (e.g. drawing scale, sheet size, units, limits, etc.)

7.2.3 Create and utilize layers for line control (e.g. line types, lineweights, colors, etc.)

7.2.4 Implement layer management (e.g. on/off, thaw/freeze, print/not print, lock/unlock, etc.)

Keys to Employability

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 3: Create and edit drawing entities.

Student Competencies

Core

7.3.1 Control basic draw commands (e.g. coordinates, lines, text, etc.)

7.3.2 Control basic edit commands (e.g. erase, copy, move, scale, rotate, etc.)

7.3.3 Apply draw and edit commands to various projects.

Advanced

7.3.4 Utilize 3-D techniques, tools, and commands. (e.g. wireframe, 3-D face, solids, solid modeling, etc.)

7.3.5 Control 3-D edit commands (e.g. region, union, extrude, subtract, etc.)

7.3.6 Generate 2-D views from 3-D entities.

7.3.7 Apply rendering techniques to 3-D entities.

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
5. Integrity/Honesty→ Chooses ethical courses of action.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 4: Practice viewing options.

Student Competencies

Core

7.4.1 Control display commands (e.g. zoom, pan, view, etc.)

7.4.2 Implement display commands within various projects.

Advanced

7.4.3 Control 3-D display commands (e.g. isometric, rotate/3-D orbit, etc.)

Keys to Employability

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 5: Use drawing aids.

Student Competencies

Core

7.5.1 Control various drawing aids (e.g. grids, snap, osnap, polar, etc.)

7.5.2 Implement drawing aids within various projects.

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 6: Apply printing/plotting commands.

Student Competencies

Introduction

7.6.1 Apply correct print/plot settings (e.g. scales, plot device, paper/page layout, etc.)

Core

7.6.2 Apply correct print/plot settings (e.g. scales, plot device, paper/page layout, etc.)

7.6.3 Print/plot various drawings.

Keys to Employability

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 7: Utilize symbols and libraries.

Student Competencies

Core

7.7.1 Insert elements from symbol libraries.

Advanced

7.7.2 Create symbols. (e.g. blocks, W-blocks, etc.)

7.7.3 Create/use attributes.

7.7.4 Insert 3-D elements from symbol libraries.

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Topic 8: Apply and manipulate text and dimensioning.

Student Competencies

Core

7.8.1 Create and utilize text and dimension styles (e.g. architectural, technical, etc.)

7.8.2 Modify text and dimension styles.

Keys to Employability

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Academic Cross Walk

English Language Arts

9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
9.2.7	Access prior knowledge to interpret meaning
10.2.1	Summarize information from nonfiction genres
11.2.3	Analyze details, facts, and concepts from nonfiction genres
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.2	Critique details, facts, and concepts from nonfiction genres
12.2.8	Use technical language/jargon to decipher meaning
9.3.11	Arrange paragraphs in a logical progression
10.3.3	Use prewriting techniques to generate ideas
10.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.3.6	Organize and write compositions for school and peers
10.3.7	Use a variety of supporting details
10.3.13	Use knowledge of sentence structure and sentence construction to edit and revise text
10.3.14	Use sentence reduction techniques to revise and edit compositions
11.3.1	Gather information supporting multiple sides of an issue
11.3.2	Organize the ideas and details of a composition according to purpose
11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.1	Write business or other formal documents, including resumes, scholarship letters, and letters of inquiry or complaint
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
9.4.1	Analyze the audience and adjust message and wording to suit purpose
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.4.5	Use critical listening skills

English Language Arts

10.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.1	Analyze the audience and adjust message and wording to suit the purpose
11.4.2	Adapt to a variety of speaking and listening situations such as formal presentations, oral interpretations, and group discussions
12.4.2	Use tone, inflection, pitch, and emphasis effectively in oral presentations
12.4.3	Analyze the audience and adjust message and wording to suit the audience while speaking
12.4.5	Use oral composition techniques to perform speeches such as memorized speeches, impromptu and extemporaneous, persuasive/argumentative, and expository speeches
9.5.1	Identify existing and developing media
9.5.2	Access media for a variety of purposes
9.5.3	Compare and contrast a written work and a media version
10.5.1	Identify existing and developing media
10.5.2	Use media for a variety of purposes
11.5.1	Identify existing and developing media
11.5.2	Apply media for a variety of purposes
12.5.2	Create a media project for a purpose
12.5.5	Examine advanced media techniques, e.g., music and sound, camera angles, lighting, and aesthetic effects
9.6.3	Use conventions of punctuation
9.6.6	Interpret symbolism
12.6.1	Use conventions of grammar, usage, and punctuation to edit and revise

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Academic Cross Walk

Library/Technology Literacy

12.1.1	Define a research problem or task.
12.1.2	Plan a research strategy.
12.1.3	Access information using a variety of sources.
12.1.4	Use a variety of criteria to evaluate and select information for research.
12.1.5	Use organizational strategies to record and synthesize* information.
12.1.6	Present research (See Standard 2 for details.).
12.1.7	Evaluate the research process.
12.2.1	Demonstrate awareness of audience when creating media products.
12.2.2	Synthesize information to create a product that meets a specific need.
12.2.3	Use a variety of criteria to evaluate media products.
12.2.4	Use a variety of media and technology to communicate with communities beyond the school.
12.3.1	Explain and use appropriate terminology and concepts associated with media and technology.
12.3.2	Demonstrate advanced knowledge and skills in various media and technology.
12.3.3	Apply strategies for identifying and solving routine hardware and software problems.
12.3.4	Explain features and uses of current and emerging media and technology.
12.3.5	Explain ways in which social and economic forces influence which technologies will be developed and used.
12.4.1	Work cooperatively and collaboratively when using media and technology.
12.4.2	Develop competence and selectivity in reading, listening, and viewing.
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment.
12.5.1	Follow school policies for responsible use of information resources.
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format.
12.5.4	Understand the impact of equitable access to information in a democracy.

Mathematics

9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.2.2	Determine congruence and similarity among geometric objects
9-10.2.5	Use Cartesian coordinates to determine distance, midpoint, and slope
9-10.2.6	Use distance, midpoint, and slope to determine relationships between points, lines, and plane figures in the Cartesian coordinate system
9-10.2.7	Identify and perform transformations of objects in the plane using sketches (translations, reflections, rotations, dilations) and coordinates (translations, reflections, dilations)
9-10.2.9	Construct plane figures using traditional and/or technological tools, i.e., congruent segments, congruent angles, angle and segment bisectors, perpendicular and parallel lines
9-10.2.10	Recognize images of the same object shown from different perspectives
9-10.2.11	Use geometric models to find solutions to problems in mathematics and other disciplines,
11-12.2.1	Use trigonometric relationships to determine side lengths and angle measures in triangles
9-10.3.1	Construct appropriate displays of given data, i.e., circle graphs, bar graphs, histograms, stem-and-leaf plots, box-and-whisker plots, and scatter plots
9-10.3.10	Identify the trend of a set of data and estimate the strength of the correlation between two variables
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements

Standard 7: Computer-Aided Drafting (CAD)—Apply and perform CAD concepts, skills, and techniques within drawings.

Academic Cross Walk

Mathematics (cont.)

9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.6	Draw graphs of linear and quadratic functions using paper and pencil, labeling key features
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled

Science

11-12.2.5	Use technology and mathematics to improve investigations and communications
9-10.6.3	Know how emerging technologies may impact society and the environment
11-12.6.1	Select and use appropriate technologies, tools, and techniques to solve a problem